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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term Particulate Matter Modeling for Health Effects Studies in California – Part II: Concentrations and Sources of Ultrafine Organic Aerosols" *by* Jianlin Hu et al.

Anonymous Referee #2

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The authors provided a long-term analysis for the spatial distribution of PM0.1, and its components including POA and SOA. By using the source apportionment method, the authors further discussed the contribution of different sources on PM0.1 and its components. The article is generally well-written, and has clearly expressed the conclusions clearly by showing convincing data analysis. I will suggest the paper published on ACP, after the authors address my following suggestions:

Pg 10: define the metric used for the evaluation: MFB and MFE. Can put the equation into the Supporting.

Pg 10: "in the first paper in the series": if the authors claimed this paper as "the fourth in the series" (Pg 5 line 70), then I suggest the authors change "the first paper" to "the

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third . . .." to avoid confusion, or do the other way.

Pg 11, line 189-190: I assume the authors were still talking about the winter when they say "Wood smoke is predicted to be . . .."?

Pg 11, line 192-193: the authors implied that the overestimation of the PM2.5 in the San Jose site was due to the overestimated emission inventory. So how did the authors make that conclusion? Was the emission inventory data significant different from the other places, or more uncertain compared with others?

Pg 12: line 217-219: I suggest the authors move the brief introduction of the 6 Obs sites into Pg 10 to Pg 10 in front of Fig. 1. Also can the authors comment why they didn't use the El Cajon site to evaluate the model's performance of simulating in PM2.5 in Fig. 1?

Pg 15, line 287: change "PM2.5" to "PM2.5-SOA fraction" or "that in PM2.5". Also the authors concluded that the SOA fraction in PM0.1 lower than that in PM2.5, but in Figure 4, we can see the fractions are higher in PM0.1 than PM2.5 in rural areas. Can the authors explain why?

Pg 34, in Figure 7 and others, also in the supplementary, I am confused about the meaning of colorbar. I thought it stands for the fractions from each source category in the total PM0.1 POA, but it seems not. What is the "maximum concentration value", maximum of the monthly mean or maximum of the yearly mean? Also how the authors made the conclusion that the dominant regional sources are "wood smoke, meat cooking . . ."? Looking at the map, most of the data are in the range of "0-10" %, and you can't tell which regions are in the 1% and which regions are in the 9%. For sources with a Max value of 900 but fractions around 1% may not be larger than the source with a Max value of 120 and fractions around 9%. Please quantify the fractions from each source before making conclusion. Also consider doing this for other similar plots.

Pg 43 & 44: Switch the order S4 and S5 to follow when they are mentioned in the

paper.

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